EOS Clearinghouse

ECHO

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Information Systems Division Branch Technical Review
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Outline

- Background

- Partner Interactions

- Current status

- Challenges

- Potential for New Technology

Background

- An *Enabling Framework* that allows interoperability among diverse and distributed, data, service and client systems

- Is a metadata clearinghouse and order broker. In the next release will also be a granule-level service broker.

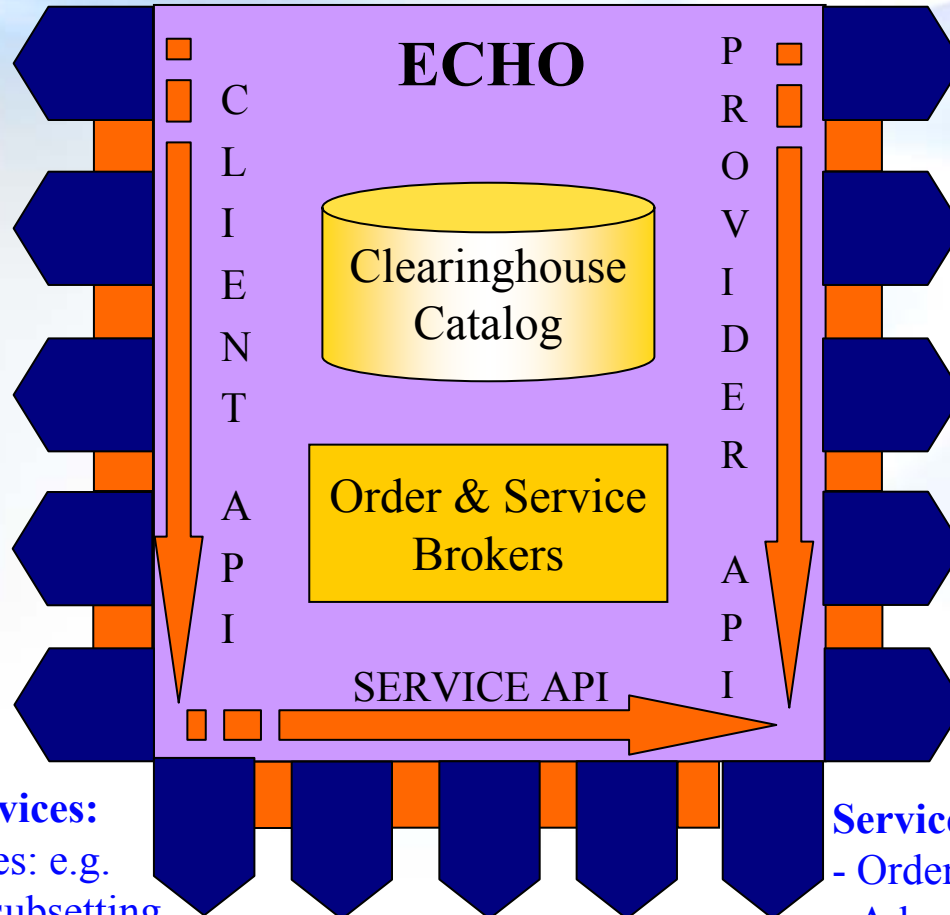- Is an Open System, enabling a Collaborative Community

Background

ECHO is… a metadata clearinghouse and order broker

Client Extensibility

- **Graphical User Interfaces (applets, active pages, etc.)**
- **Machine-to-Machine Interfaces**

ECHO

Clearinghouse Catalog

Order & Service Brokers

CLIENT API

PROVIDER API

SERVICE API

Data Extensibility

- **New Data Partners**
- **- Can establish policies for their own data**
- **New Collections/Data Types**
- **Access Mechanisms**

Service Extensibility

Types of services:
- Data Services: e.g. collection, subsetting
- Search Services: e.g. gazetteer, thesaurus (future)
- Administrative Services: e.g. accounting (future)

Views:
- Service View
- Data View

Service interactions:
- Order Options
- Advertised
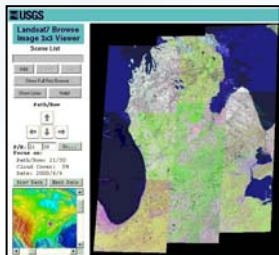- Context Passing (future)
- Brokered (future)

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Background

Systems of diverse standards and protocols can interoperate through standards mapping in ECHO

Client Providers

Data Providers (Grid and non-GRID

ECHO

V0 Protocol

XML

SOAP

XML

SOAP

SOAP

XML

OGC

SOAP

UDDI

XML

XML

WSDL

Other Federated Systems

Future

Interoperable User Interface Functions

Future

In progress

**Interoperable Service Providers (Grid and non-GRID)**

Background

- EOSDIS IMS
- Change in technology
- Change in user requirements
- Realization that these changes will continue
- Opportunity to Innovate
  - Established a team working environment that nurtured innovation
  - Allowed us to develop processes and approaches that will better withstand change
  - Allowed us to prioritize quality attributes and to develop architectures and designs that will support evolving systems

Background
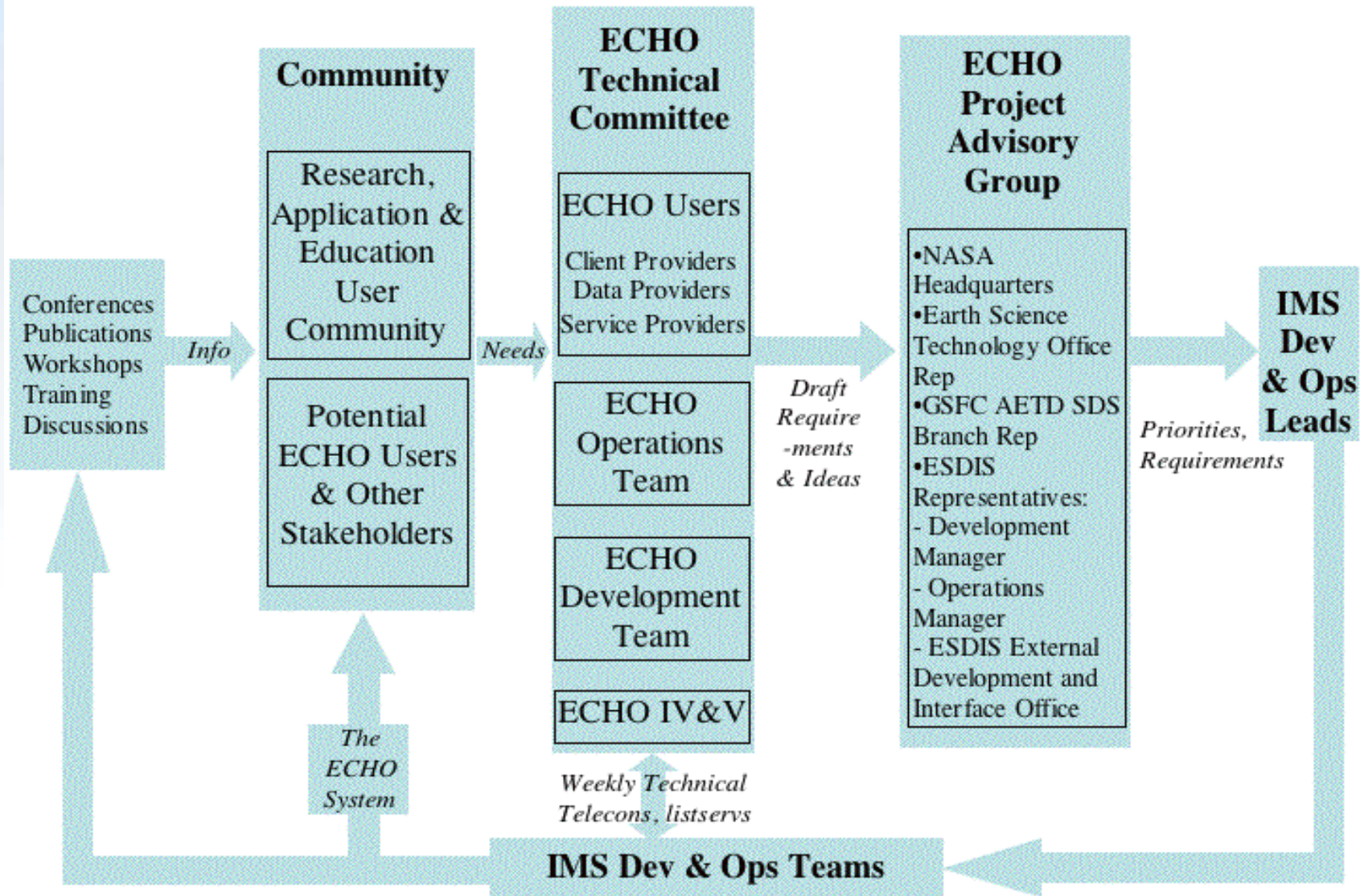
Background

■ ECHO is on the same technology found in today's e-commerce web sites

■ APIs are based on XML, RMI, SOAP, Web Services

■ ECHO is designed to mature with time as industry technologies change and improve
  • Using code generation and XML transformation techniques to simplify API management
  • Re-planning ECHO's hardware to be Intel based where possible in order to be more cost effective
  • Adding XML Schema capabilities (near future)
  • Expanding ECHO's web service view to include all of its constituent services (near future)
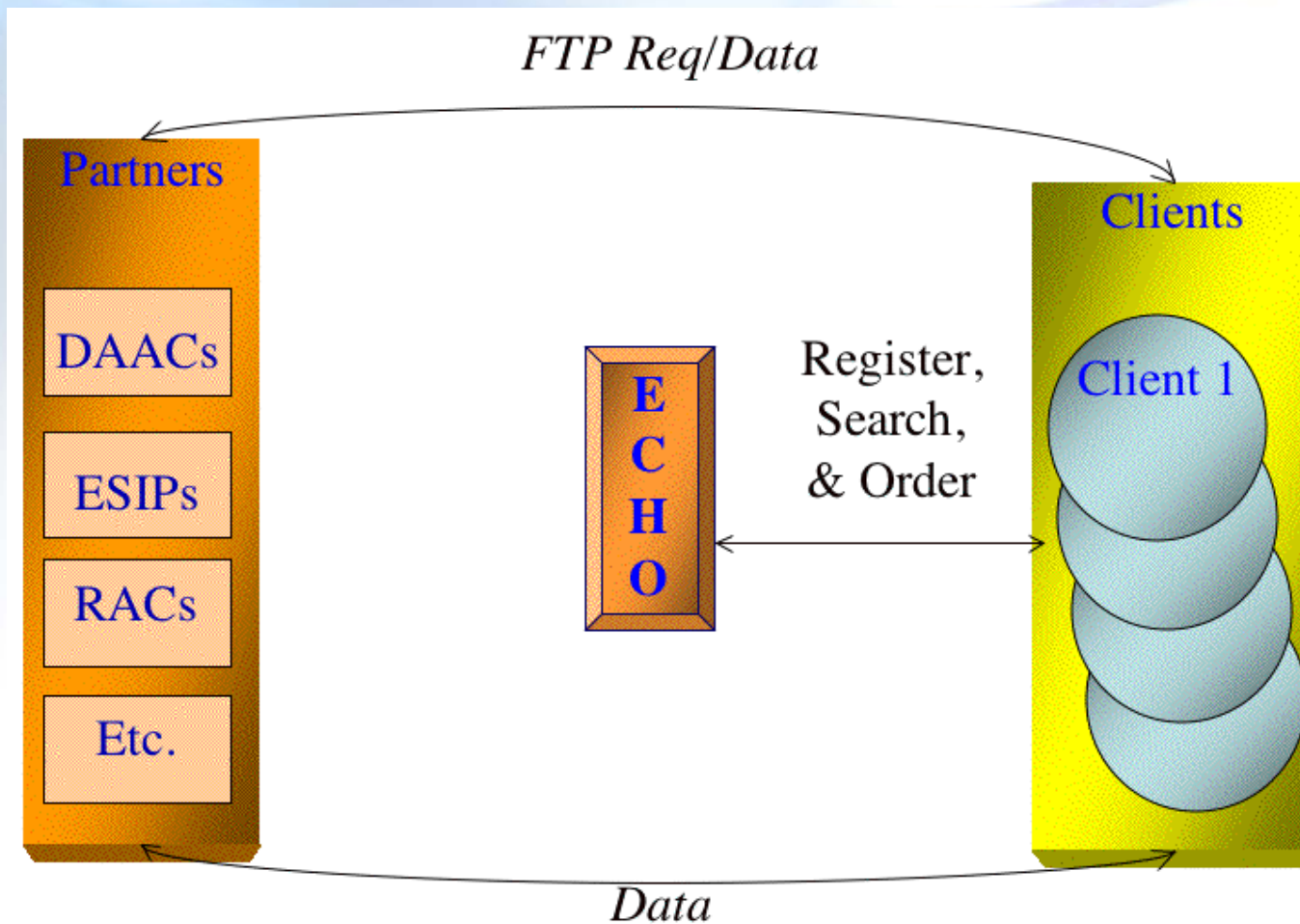 • Future - Examine GRID and SRB technologies to facilitate planned ECHO functions (future)
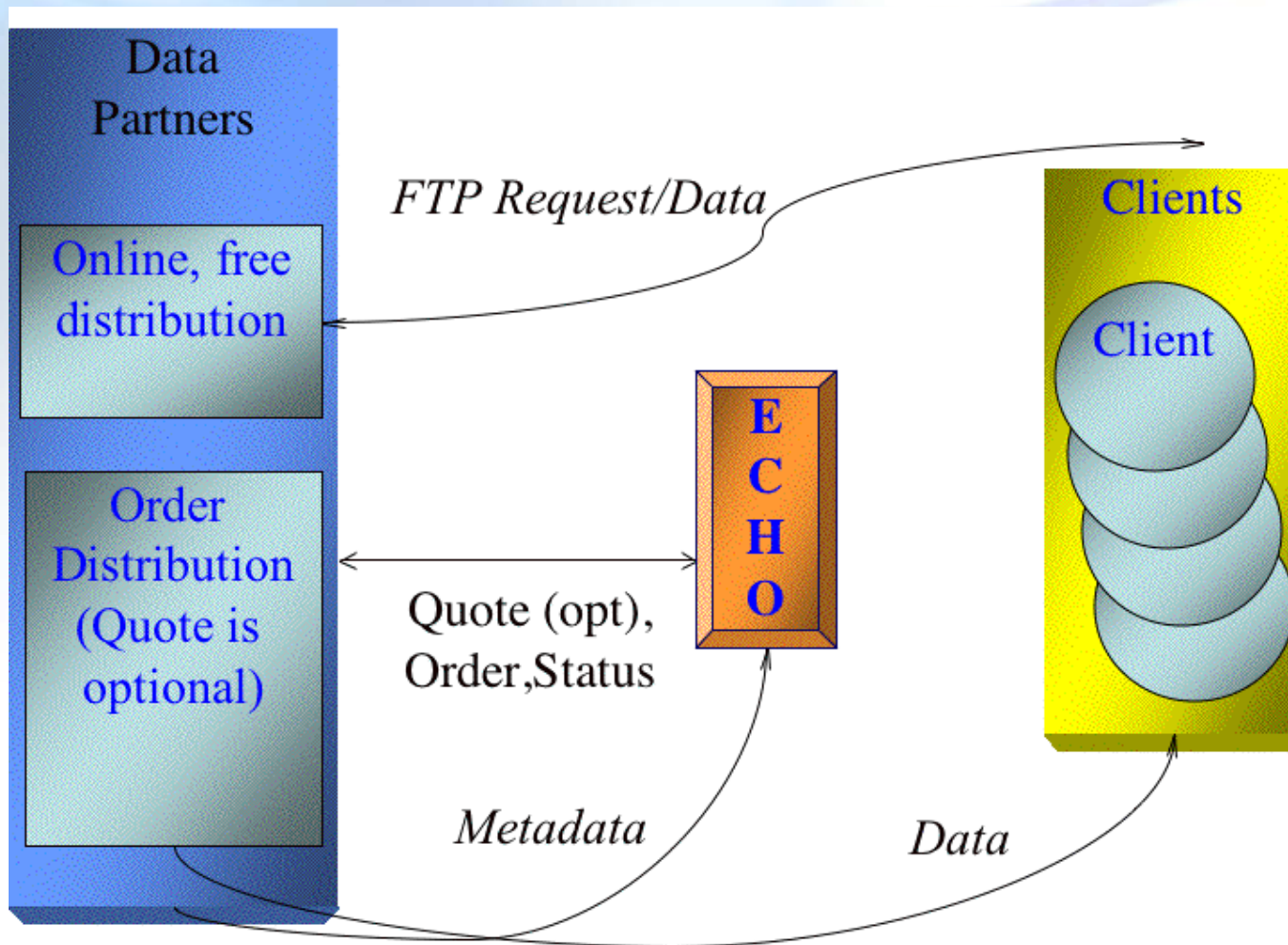
Layered Interface approach
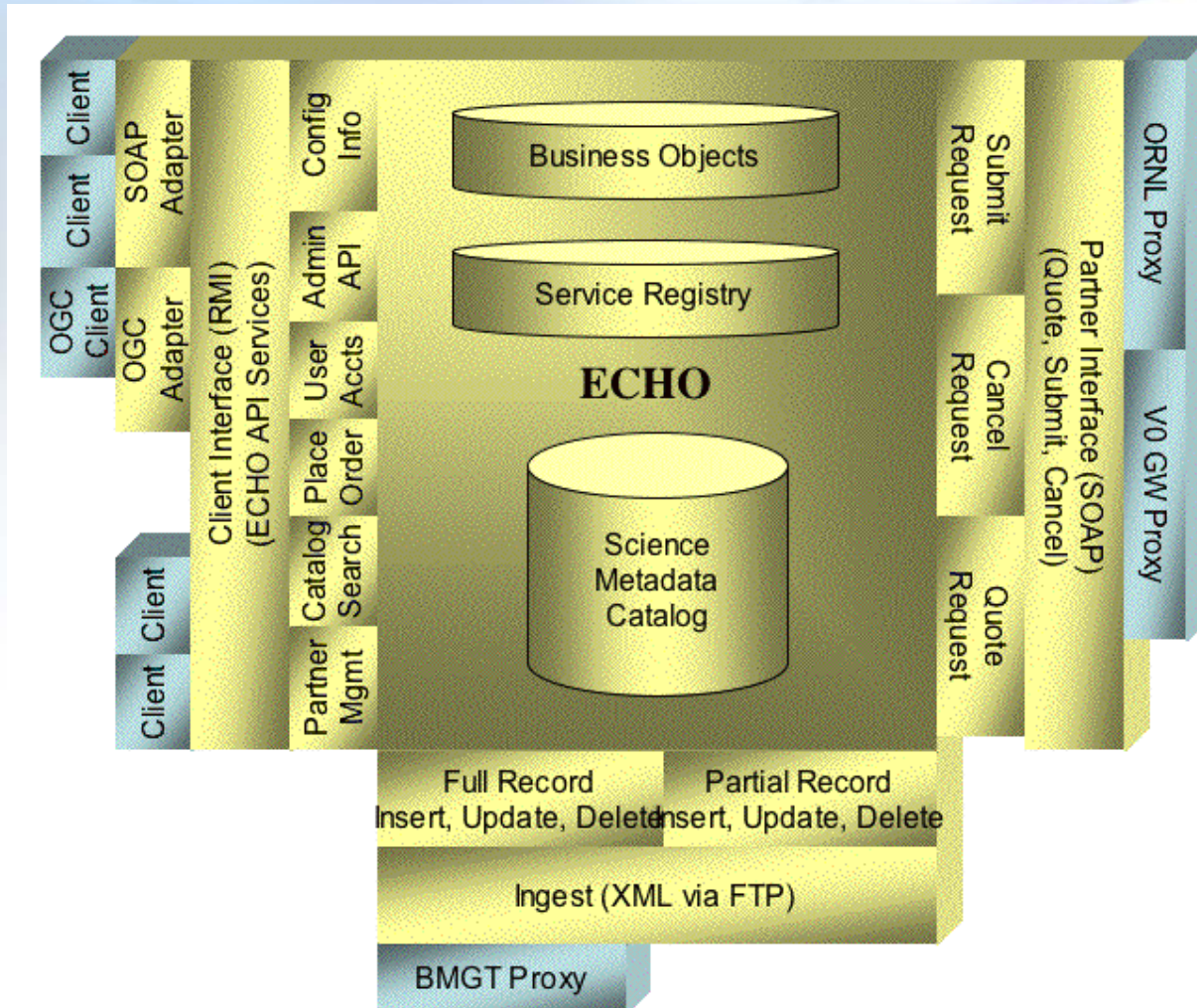
Client Partner Interactions

- New clients can be added at any time
- Various ESE communities control metadata views

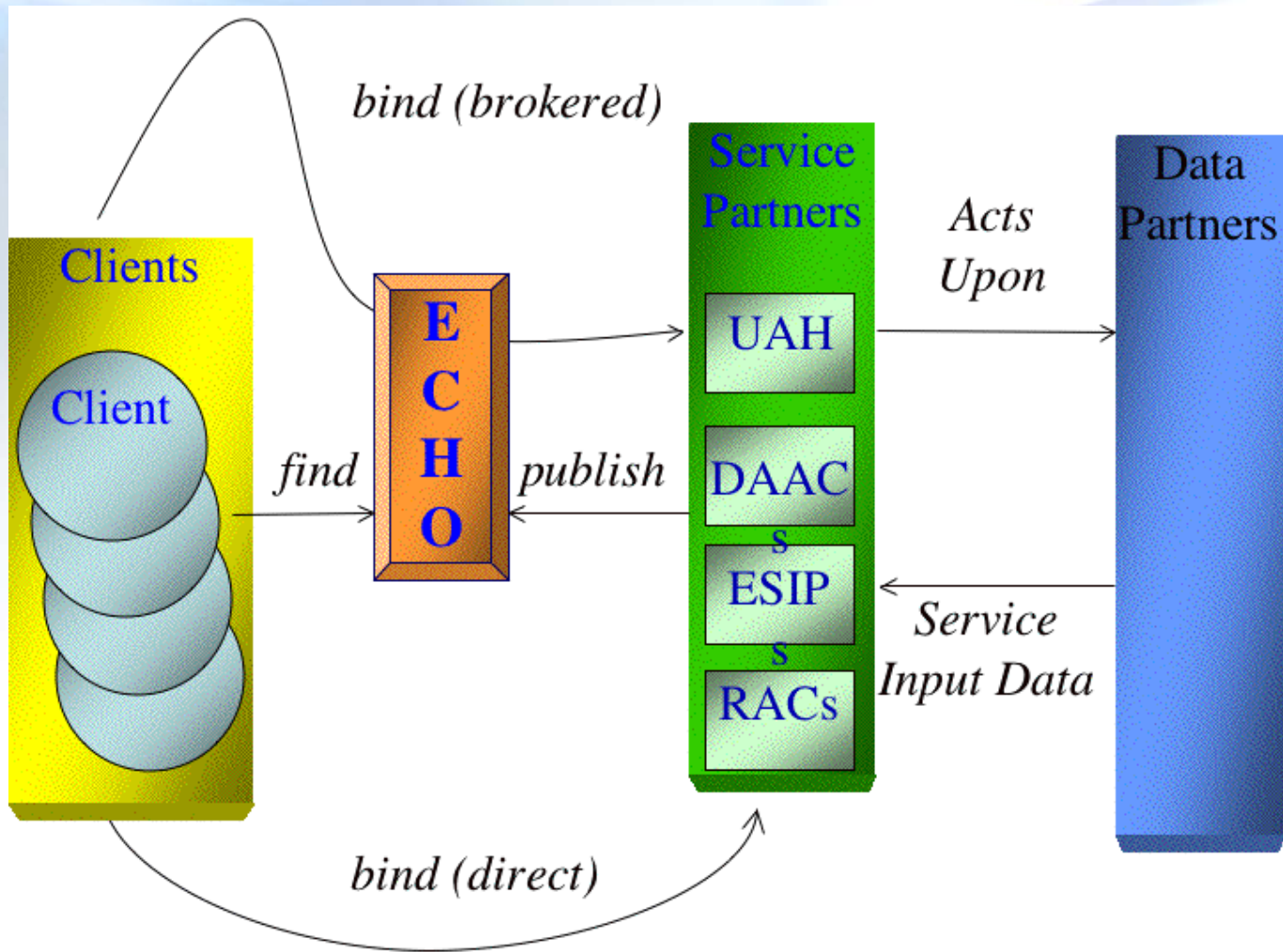•New data partners can be added at any time
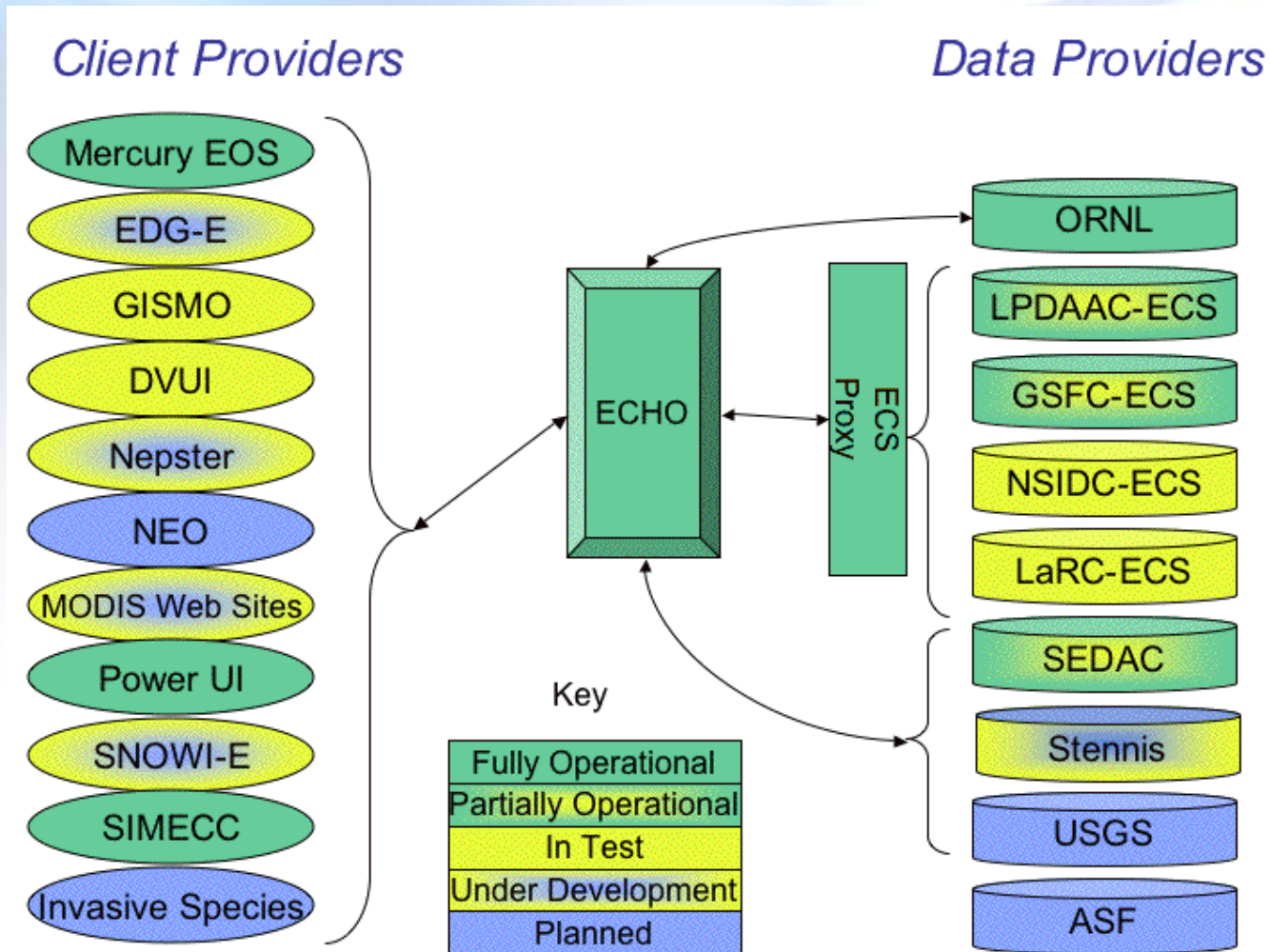•Provides search services for partners

• New services can be added at any time
• Offers a consistent view of services for clients
• Enables brokering of services with data

Current Status

Current Status

- ECHO 5.5 Release by end of May includes:
  - Enhanced query functionality with Backtrack Algorithm to search for multi-orbit swath data.
  - Enhance API with Collection Inspection Function to address the issue of validating ECHO holdings against Provider holdings.
  - Improve Ingest Error Alert Mechanism and Logs for Operations Staff.
  - Improve Ingest Behavior.
  - Develop architecture for improved error handling
- ECHO 6.0 expected to be released by Fall '04 includes:
  - Add the registration, searching, and management of Advertised Services.
  - Enhance ECHO to allow granule searches using ProviderInsertDate and ProviderProductionDate.
  - Enhance ECHO to handle searches that contain more than one Product Specific Attributes (PSA).
  - Improve Ingest based on work started in Version 5.5.
  - Add the ability to check incoming metadata against the provider-defined valids in order to catch faulty data before it is put into the clearinghouse.
  - Enable access control lists to be defined based on the existence of a provider-defined "Restricted" flag, a new science metadata field.
  - Enable querying for granules using one or more measured parameter attributes.

Challenges

- Technical

- Programmatic

Challenges

- There are dependencies between the different OTS.
  - E.g we can't upgrade to WebLogic 8 because TopLink does not yet support it.

- Multiple dependencies on different versions of the same OTS - Xerces example.
  - Problems of this nature typically do not appear until integration testing is complete. To reduce the impact of these kinds of problems we test on operation-like hardware before we send the system for independent verification and validation.
  - When we do run into problems, it can throw a HUGE wrench into our schedule.

Challenges

- Procurement

- External push to accelerate development, questionable budget

- Headquarters oversight
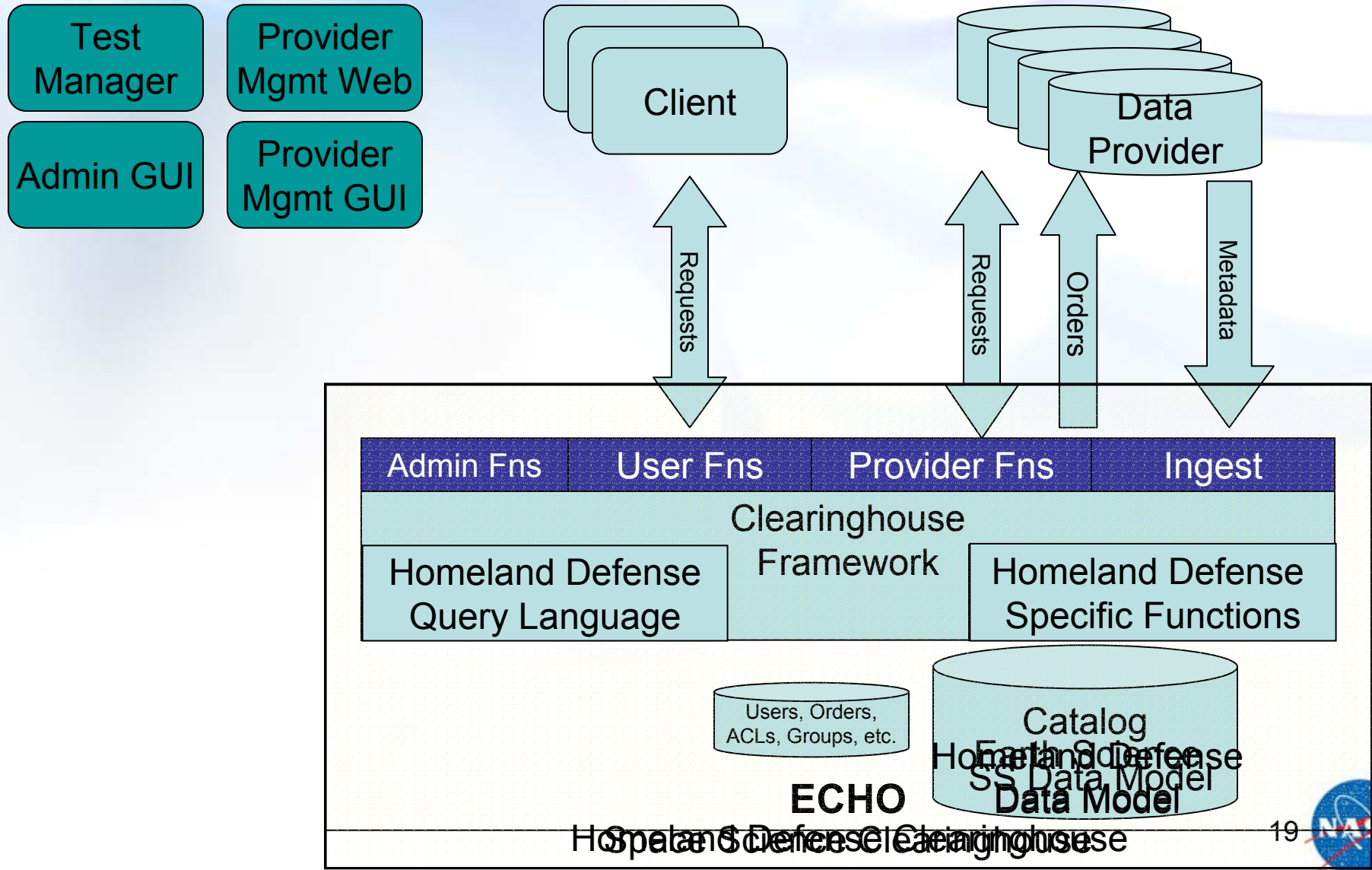
ECHO's Potential for New Technology

Beyond its original mission

- Mechanism for Technology Infusion

- An Interoperability Framework that can serve other NASA funded applications that are not part of the EOSDIS.

- Potential Re-Use
  - As a whole system
  - Subcomponents, Ancillary tools, approaches
  - Tech Transfer and Commercialization process is underway
  - The principal activities:
    - Completing release request forms and registering the reuse software with the NASA Technology Transfer Office
    - Packaging the software; includes source code, libraries, and configuration files
    - Collecting and preparing supporting documentation associated with the software
    - Managing the packaged and documentation in a ECHO-hosted temporary storage area pending distribution format requirements (e.g. ftp or CDs)
  - ECHO code has already been requested by Industry

Re-Use

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